

US EPA ARCHIVE DOCUMENT

**REPORT OF THE DEPARTMENT OF CONSERVATION AND
RECREATION**

**FEDERAL CLEAN WATER ACT SECTION
319 NONPOINT SOURCE POLLUTION
MANAGEMENT PROGRAM –**

**2006 TOTAL MAXIMUM DAILY LOAD
(TMDL) IMPLEMENTATION PROGRAM
SUMMARY SUPPLEMENTAL REPORT**

**TO THE GOVERNOR AND THE GENERAL ASSEMBLY OF
VIRGINIA**



DRAFT

**COMMONWEALTH OF VIRGINIA
RICHMOND
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2006 Virginia Total Maximum Daily Load Program

Background

Virginia's goal is that all rivers, lakes, streams and tidal waters attain the appropriate beneficial uses. These beneficial uses are described by the following use goals: drinking water, primary contact/swimming, fishing, shellfishing, and aquatic life. These uses are protected by application of the state's numeric and narrative water quality criteria. When the beneficial uses are not being met these waters are considered "impaired" and the state must take steps to meet water quality standards ensure that water quality is restored. One very important step in restoring water quality in the impaired streams is the development of Total Maximum Daily Loads, or TMDLs. The goal of Virginia's Total Maximum Daily Load (TMDL) program is to achieve attainment of water quality standards. The Commonwealth achieves this goal by means of a three-phase process: TMDL development, development of TMDL Implementation Plans (IP) and/or permit conditions, and implementation of permit conditions and/or best management practices. TMDL Reports, Implementation Plans and Implementation progress updates are available on the Department of Environmental Quality's (DEQ) TMDL website at <http://www.deq.virginia.gov/tmdl>.

TMDLs are required for water bodies that are determined to be impaired. In general, TMDL development is required under Section 303(d) of the Federal Clean Water Act and the U.S. Environmental Protection Agency's (EPA) Water Quality Planning and Management Regulations (40 CFR Part 130). The Virginia TMDL program is also governed by a federal court Consent Decree that lays out a schedule for TMDL development through 2010 for waters identified as impaired by 1998. For all other water bodies, TMDL development will be scheduled within 8-12 years of finding the water body impaired.

The TMDL process begins with the development of a TMDL that, when implemented, will result in the attainment of existing water quality standards. In order to develop a TMDL, background concentrations, point source loadings (i.e. loadings from sources permitted to discharge to state waters under Virginia Pollutant Discharge Elimination System (VPDES) permits), and non-point source loadings are considered. A TMDL also accounts for seasonal variations and includes a margin of safety. A TMDL study identifies sources of pollution and reductions needed from the identified pollutants to attain water quality standards. Pollution from both point sources such as residential, municipal, or industrial discharges and nonpoint sources such as residential, urban, or agricultural runoff are included in the TMDL study.

2006 Summary

The TMDL Program has been working under the above-described method since 2000. During this period great strides have been made in the development of TMDLs to meet the EPA consent decree, the development of implementation plans (IPs) and the implementation of TMDLs through watershed restoration work. In March 2007, DEQ, in cooperation with the Department of Conservation and Recreation (DCR) and the Department of Mines, Minerals and Energy (DMME), will release a report that describes the 6-year progress of TMDL development, implementation plans and the application of best management practices in Virginia's TMDL program. The report will be available on DEQ's website at www.deq.virginia.gov/tmdl.

During 2006, DEQ and DCR, along with other agency and non-agency partners, continued to develop and implement TMDLs throughout Virginia. During 2006, the work of these agencies resulted in the development of 90 TMDLs (consent decree, non-consent decree and shellfish), and the development of 9 Implementation Plans. During 2006, there were 10 active §319(h) funded implementation projects. Collectively these projects implemented Best Management Practices (BMPs) that resulted in the reduction of 5.54E+15 colony forming units (CFU) of Fecal Coliform bacteria, 2,904 pounds of nitrogen, 411 pounds of phosphorous, and 253 tons of sediment. A full description of the activities undertaken by the TMDL program will be contained in this report.

TMDL Development

The Virginia TMDL program to date has successfully met the demands of a rigorous development schedule. Table 1 below summarizes the TMDLs that have been developed from 1999 through June 2006. As of May 2006, Virginia had completed 344 TMDLs, 168 for free flowing streams and 107 for shellfish closures and de-listed an additional 72 impairments.

Table 1 - Impairments with TMDLs Developed from 1/1/99 – 6/30/06 (Excerpted from DEQ "TMDL Program Six Year Progress Report: 2000-2006")									
	Total	Bacteria ^a	Benthic ^b	PCB	Nitrate	pH	DO	Amonia	Temp
TMDLs Completed (CD and Non CD)	344	168 (nonshellfish) 107 (shellfish)	61	5	2	0	1	0	0
Consent Decree Delistings	72								
- full	65	41 ^c	8	0	1	5 ^e	5 ^e	1	4
- partial	7 ^d	2	3	0	0	1	1	0	0

a - TMDLs were completed for 168 non shellfish and 107 shellfish bacteria impairments
b - 76 TMDLs were completed on 61 segments identified as impaired for benthics
c - The bacteria delists include 18 non shellfish and 23 shellfish
d - Three of the partial delists will not be credited as complete until 2008 or 2010 when the remaining impairments are addressed.
e - de-listing as a result of natural conditions.

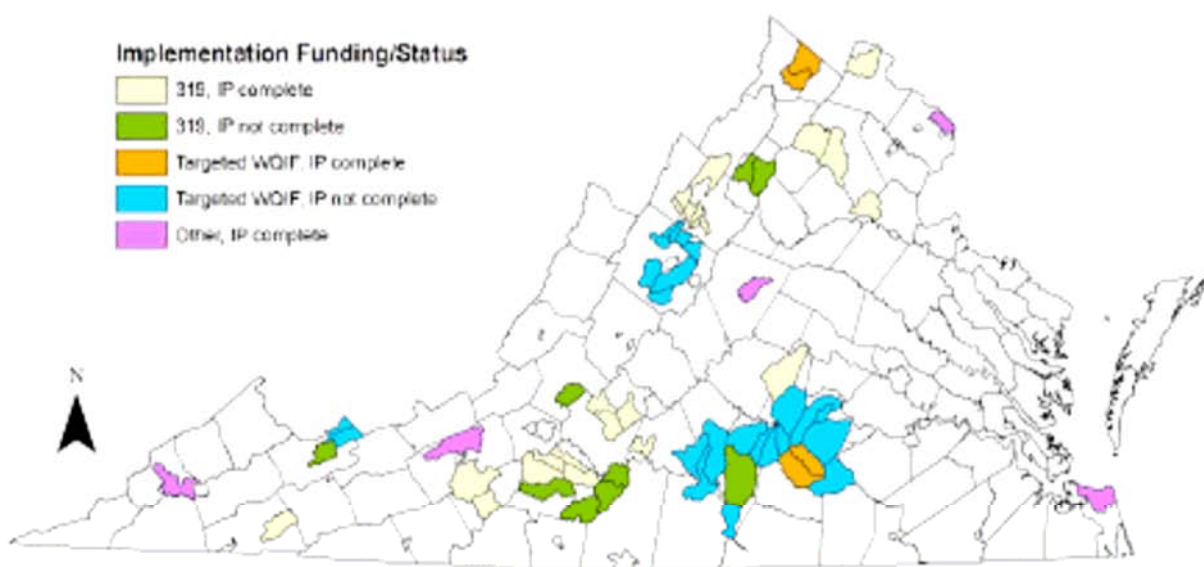
For this report, a TMDL segment described as a 'consent decree segment' is defined as such by the 1999 federal Consent Decree, which extends until May 1, 2010. 'Consent decree segments' may include one or more impairments per segment. Some waters that are not consent decree segments are included in the tables as well. These waters are specifically labeled as non-consent decree or 'non CD' segments. The numbers for non-consent decree impaired segments were obtained from the 2006 305(b)/303(d) Water Quality Assessment Integrated Report. After May 2010, DEQ will develop a new TMDL development schedule to address the impaired waters added to the 303(d) list since 1998, using guidance of completing TMDLs within 12 years of listing. Approximately 175 segments have been contract for completion by May 1, 2008. Approximately 134 consent decree waters remain and are scheduled for TMDL development by 2010.

Table 2 – Summary TMDL Development of Consent Decree Segments (Excerpted from DEQ “TMDL Program Six Year Progress Report: 2000-2006”)	
Total Waters under Consent Decree (CD)	657
Freshwater CD Waters Completed or Delisted in 1999 - 2006	218
Freshwater CD Waters Contracted for 2008	115
Shellfish CD Waters Completed or Delisted in 2004 - 2006	131
Shellfish CD Waters Due in 2008	59
Remaining CD Waters to be completed by 2010	134

Implementation Plans

Once the TMDL study (i.e., development phase) is complete, the report is submitted to EPA for approval. Following EPA's approval of the TMDL, an Implementation Plan (IP) is developed. Virginia state law (1997 Water Quality Monitoring, Information, and Restoration Act (§62.1- 44.19:4 through 19:8 of the Code of Virginia), or WQMIRA, requires the development of a TMDL IP. There is not a mandated schedule as to when an IP is to be developed upon approval of the TMDL. Local or state agencies, as well as community watershed groups, can take the lead in developing TMDL IPs. The IP describes the measures that must be taken to reduce pollution levels in the stream, and includes a schedule of actions, costs, and monitoring. DCR and DEQ have both worked on the development of approved Implementation Plans. Figure 1 illustrates the distribution of IPs and funding source by watershed throughout Virginia. It should be noted that the IPs for implementation earmarked for funding by ‘Targeted WQIF’ are being completed by a combination of in-house efforts by DEQ and DCR in addition to §319(h) funded efforts.

Figure 1 – Implementation Status and Funding by Watershed (Source “TMDL Program Six Year Progress Report: 2000-2006,” DEQ 2007)



EPA require states to report their success of implementing watershed plans to meet EPA performance measure WQ-28 “*Number of watershed-based plans, supported under State NPS Management Programs since the beginning of FY 2002 that have been substantially implemented.*” In 2006 DCR and DEQ completed 9 implementation plans covering 24 TMDL segments (five of these plans utilized §319(h) funds). To date 21 IPs have been completed, covering over 60 TMDL segments and 76 impairments (Table 3).

Table 3 – Summary of Completed Implementation Plans (IP)

Watershed (# of TMDLs)	Location	Impairment	Agency Lead	IP Complete
Middle Fork Holston (3)	Washington Co.	Fecal Coliform (FC)	DCR	2001
North River (4)	Rockingham Co.	FC, Benthic (Be), NI	DCR	2001
Upper Blackwater River (4)	Franklin Co	FC	DCR	2001
Catoctin Creek (4)	Loudoun Co.	FC	DCR	2004
Holmans Creek (2)	Sheandoah Co.	FC	DCR	2004
Four Mile Run (1) *	Arlington & Alexandria	FC	DEQ	2004**
Willis Creek (1)	Cumberland & Buckingham	FC	DCR	2005
Chowan Study Area (8)*	(Multiple counties)	FC	DEQ	2005**
Moore's Creek (1) *	Charlottesville	FC	DEQ	2005**
Guest River (5) *	Wise, Scott, Dickenson	Be	DEQ	2005
Lower Blackwater, Maggoddee & Gills Creek (3)*	Franklin Co.	FC	DCR	2005
Lynnhaven (Shellfish) (1)*	VA Beach	FC, Be	DEQ	2005**
Cooks Creek and Blacks Run (4)	Rockingham Co., City of Harrisonburg	FC, Be	DCR	2006
Thumb, Deep, Carter & Great Runs (4)	Fauquier Co.	FC, E. coli	DCR	2006
Big Otter (5)	Bedford & Campbell Co.	FC	DCR	2006
Dodd Creek and Mill Creek (2)	Floyd & Montgomery Co.	FC	DCR	2006
Little Creek and Beaver Creek (3)	Bristol, Washington Co.	FC, E.coli, Be	DCR	2006
Stroubles Creek (1) *	Montgomery Co	Be	DEQ	2006**
Back Creek (2) *	Pulaski Co.	E. coli, Be	DEQ	2006/07**
Abrams & Opequon Creek (5)*	Frederick & Winchester Co	E. coli, Be	DEQ	2006**
Knox & PawPaw Creek (2) *	Buchanan Co.	E. coli, Be	DEQ	2006**
TOTAL IPs Completed = Plans (21), Segments (60), impairments (76)				
Note: All IPs are being funded by §319(h), except those done in-house by either DCR or DEQ, indicated by a (*). For all completed IPs, except those indicated with (**), implementation is being partially or fully funded by Section 319(h) funds.				

In the summer of 2006, DCR TMDL staff, with input from DCR and DEQ regional staff, produced a ranking of TMDLs completed as of May 2006 (with the exception of shellfish TMDLs) for the development and scheduling of implementation plans. The developed ranking of 125 impaired stream segments was based on a set of nine criteria. These segments were grouped into 55 proposed implementation plans based on location, locality and SWCD boundaries, impairment complexity and recommendations from regional DEQ and DCR staff. Based on available funding and staffing, a list was developed of 14 implementation plans (covering 36 segments and 49 impairments) proposed to start by October 2007 (Table 4). Anticipated time to complete each of the IPs is approximately 9 months. These areas were selected based on the rankings, basin distribution, staff time, targeting of WQIA funds to TMDLs, and complexity of the impairments.

Table 4 – Status Progress of Implementation Plan (IP) Development

Watershed (# of TMDLs)	HU	Location	Impairment	Agency Lead	IP Start Date
Hawksbill & Mill Creek (2)	B38, B39	Page Co.	E. coli	DCR	10/1/06**
Looney Creek (1)	I26	Botetourt Co.	FC, E. coli	DCR	10/1/06**
Upper Clinch River (1)	P01	Tazwell Co.	Benthic (Be)	DCR	12/1/06
Falling River (1)	L34	Campbell Co.	E. coli	DCR	2007
Mossy Creek, Long Glade Run, and Naked Creek (4)*	B19, B24, B28	Augusta/ Rockingham Co.	Fecal Coliform (FC), Be	DCR/DEQ	2007
Pigg River (6)	L13 - L18	Paige Co.	E. coli	DEQ	2007
Twittys Creek & Ash Camp Creek (2)	L39	Charlotte	E. coli, Be	DEQ	2007
Spring, Little Sandy, Bush, Briery Sayler Crk (5)	J02 - J06	Prince Edward & Amelia Co	E. coli	DCR	2007
Cub, Turnip & Buffalo Creek (3)	L36, L37, L40	Charlotte	E. coli	DEQ	2007
Flat, Nibbs, Deep and West Creeks (4)	J08, J09, J11	Prince Edward & Amelia Co.	E. coli, Be	DEQ	2007
Laurel Fork (1)	N37	Tazewell	E. coli, Be	DCR	2007
Bluestone River (1)	N36	Tazewell	E. coli, Be	DCR	2007
South & Christian R (3) *	B14, B30	Augusta	FC, Be	DCR	2007
Moffett Crk, Upper/Lower Middle River, Polecat Draft (4)	B10, B13, B15	Augusta	FC	DCR	2007

TOTAL IPs In Progress = Plans (14), Segments (36), impairments (49)

Note: All IPs are being funded by §319(h), except those done in-house by either DCR or DEQ, indicated by a (*). For all IPs currently in progress, except those indicated with () which are being funded by 319, funding from WQIF is being targeted for their implementation.**

Watershed Restoration and TMDL Implementation:

History of TMDL Implementation Program:

The goal of this program is to implement on-the-ground activities, through TMDL watershed implementation plans, that result in watershed restoration and increased water quality improvements and ultimate delisting of impaired stream segments. Virginia uses a staged approach to many TMDLs, which provides opportunities for periodic evaluation of the effectiveness of the implementation actions and adjustment of efforts to achieve water quality objectives in a timely and cost-effective manner. The history of TMDL implementation in Virginia dates back six years ago when DCR started three Pilot TMDL Implementation Projects (Middle Fork Holston, Blackwater River and North River). Now, 6 years later, the program consists of 33 active, organized implementation projects (with plans completed or in progress), all funded through a variety of sources included federal, state, local and non-profit sources (Table 5).

Table 5: Status of TMDL/ Watershed Implementation Projects

Watershed Area	TMDL Segment	Water quality Improvement	Year Start	Lead Agency	Funds Used
Projects 1-12 are being funded by 319(h) funds administered by DCR					
1-North River	VAN-B21R, B22R, B27R & B29R	Moderate improvement	2001	DCR	\$319(h)
2-Middle Fork Holston River	VAS-O05R	Moderate improvement	2001	DCR	\$319(h)
3-Upper Blackwater River	LAW-L08R	Some improvement	2001	DCR	\$319(h)
4-Catoctin Creek	VAN-A-02R	Too early to determine	2005	DCR	\$319(h)
5-Holmans Creek	VAV-B45R	Too early to determine	2005	DCR	\$319(h)
6-Willis River	VAC-H36R	Improvement	2005	DCR	\$319(h)
7-Lower Blackwater River	VAW-L09R, L10R and L11R	Too early to determine	2006	DCR	\$319(h)
8-Cooks Creeks & Blacks Run	VAV-B25R & B26R	Too early to determine	2006	DCR	\$319(h)
9-Thumb, Great, Carter & Deep Runs	VAN-E01R, E02R & E10R	Too early to determine	2006	DCR	\$319(h)
10-Big Otter River	VAW-L23R, L25R, L27R, & L28R	Too early to determine	2006	DCR	\$319(h)
11-Mill and Dodd Creeks	VAW-N20R & N21R	Not started	2007	DCR	\$319(h)
12-Little and Beaver Creeks	VAS-O07	Not started	2007	DCR	\$319(h)
Projects 13-16 have received some WQIA RFP funds (and other funds as well)					
13-Moore's Creek	VAV-H28R	Too early to determine	2005	DCR	RFP
14-Guest River	VAS-P11R	Too early to determine	2005	DCR	\$319(h), RFP
15-Opequeon Creek	VAV-B09R	Too early to determine	2006	DCR	WQIF, RFP
16-Stroubles Creek	VAW-N22R	Too early to determine	2006	DCR	RFP
Projects 16-20 are not receiving designated funding from WQIF, RFP or 319(h)					
17-Four Mile Run	VAN-A12R	No improvement	2002	DEQ	OTHER
18-Middle Creek/Tazewell County	VAS-P03R	Delisted 2006	N/A	DMME	OTHER
19-Quail Run/Rockingham County	VAV-B35R	Delisted 2005	N/A	DEQ	OTHER
20-Lynnhaven (Shellfish)	VAT-V08E	Too early to determine	2005	DEQ	OTHER
Projects 21-33 have received some WQIA RFP funds (and other funds as well)					
21-Chowan Study Area	VASC-K14R, K15R, K16R, VAP-K22R, K24R, K25R and K32R	Too early to determine	2005	DEQ	WQIF
22-Falling River	VAW-L34R	Too early to determine	2006	DCR/NRCS	WQIF
23-Mossy & Naked Creeks, Long Glade Run	VAV-B19R, B24R, B28R	Too early to determine	2006	DCR/NRCS	WQIF
24-Pigg River (Blue Ridge SWCD)	VAW-L14R, L15R, L16R, L17R	Too early to determine	2006	DCR/NRCS	WQIF
24-Pigg River (Pittsylvania SWCD)	VAW-L13R, L17R, L18R	Too early to determine	2006	DCR/NRCS	WQIF
26-Twittys and Ash Camp Creeks	VAC-L39R	Too early to determine	2006	DCR/NRCS	WQIF
27-Cub, Turnip and Buffalo Creek	VAC-L36R, L37R, L40R	Too early to determine	2006	DCR/NRCS	WQIF
28-Flat, Nibbs, Deep, West Creeks	VAP-J08R, J09R, J11R	Too early to determine	2006	DCR/NRCS	WQIF
29-Moffett Creek, Middle River, Polecat Draft	B10, B13, B15	Too early to determine	2006	DCR/NRCS	WQIF
30-Christians Creek & South River	B14, B30	Too early to determine	2006	DCR/NRCS	WQIF
31-Upper Clinch River	VAS-P01R	Too early to determine	2006	DCR/NRCS	WQIF
32-Spring et. al	VAC-J02R-J06R	Too early to determine	2006	DCR/NRCS	WQIF
33-Abrams& Opequon Creeks	VAV-B08R	Too early to determine	2006	DCR/NRCS	WQIF

Pilot Projects: (Middle Fork Holston River, Upper Blackwater River and North River). These three projects ended their 5-year implementation phase at the end of 2006 and all three will continue in 2007 for a sixth and potentially final year of implementation funded through 319(h). All three projects have shown some water quality improvements due to BMP installation. Two of the projects (Middle Fork and North River) had sub-watersheds of the projects nominated and accepted as Success Stories by EPA Headquarters for 2005 and 2006 respectively. It was primarily due to these successes that it was decided to fund a 6th year of implementation for these 3 projects to finish up contractual commitments for BMPs and to work towards de-listing in three watersheds that are close. During 2007 an analysis of implementation success will be completed

for all 3 projects to determine the ability of furthering implementation to meet water quality standards. Specifically, the Lower Dry River section of the North River project area will be assessed to determine what would be needed to achieve less than a 10.5% violation rate and eventual de-listing. More information on the North River Project can be found in the Case Study section of this report.

Non-Pilot §319(h) Projects: In addition to the first 3 pilot projects, DCR commenced three additional implementation projects in 2005 (Catoclin Creek, Holmans Creek and Willis River) and four additional projects in 2006 (Lower Blackwater River, Cooks Creek & Blacks Run, Big Otter River, and Thumb, Deep Carter and Great Runs).

In 2007 DCR will begin 2 more §319(h) funded projects, bringing the total number of active TMDL Implementation Projects funded with §319(h) funds in 2007, to 12 watersheds. More detailed descriptions of the 6 new projects can be found later in this section under “New 319 TMDL Implementation Projects”

Funding of Implementation:

As the agency taking the lead in TMDL Watershed Implementation, DCR utilizes both state general funds and §319(h) funds to pay for DCR regional staff to provide project management and technical support to watershed stakeholders to implement these projects. Prior to July 2006 the only targeted funding available for TMDL implementation in Virginia has been from EPA’s 319 program. This funding can be used to pay for agricultural BMPs, urban BMPs, and residential BMPs such as failing on-site septic systems, technical assistance (provided through Soil and Water Conservation Districts and local Health Departments) and outreach/technology transfer. By the end of 2006 there were 10 implementation projects being managed by DCR and funded by §319(h). Table 6 presents a summary of §319(h) funds spent on implementation and technical assistance during calendar years 2005 and 2006.

Table 6: Section 319(h) \$ spent on TMDL implementation 2005-2006				
Project Title	TMDL ID	2005	2006	TOTAL
Middle Fork Holston TMDL Project	VAS-O05R	\$ 497,679	\$ 490,181	\$ 987,860
Blackwater River TMDL Project	VAW-L08R	\$ 170,625	\$ 150,769	\$ 321,394
North River TMDL Project	VAN-B21R, B22R, B27R & B29R	\$ 211,000	\$ 199,433	\$ 410,433
Catoclin Creek TMDL Project	VAN-A02R	\$ 190,588	\$ 284,432	\$ 475,020
Holmans Creek TMDL Project	VAV-B45R	\$ 135,910	\$ 123,630	\$ 259,540
Willis River TMDL Project	VAC-H36R	\$ 139,165	\$ 330,000	\$ 469,165
Cooks Creek and Blacks Run TMDL Project	VAV-B25R & B26R	n/a	\$ 40,000	\$ 40,000
Lower Blackwater TMDL Project	VAW-L09R, L10R & L11R	n/a	\$ 126,910	\$ 126,910
Thumb, Deep, Carter and Great Runs TMDL Project	VAN-E01R, E02R & E10R	n/a	\$ 70,015	\$ 70,015
Big Otter River TMDL Project	VAW-L23R, L25R, L27R, & L28R	n/a	\$ 120,000	\$ 120,000
TOTAL		\$1,344,967	\$ 1,935,370	\$3,290,337

Due to the limited amount of §319(h) funds available, Virginia identifies and leverages additional funding to fully implement the TMDLs, especially with regard to agricultural BMPs. Starting in July 2006, DCR began targeting a portion of Water Quality Improvement Fund (WQIF) agricultural cost-share funds to eight (8) Soil and Water Conservation Districts to fund

15 implementation projects in 46 TMDL segments. In addition to the targeted cost-share, DCR allocated state general funds to provide technical assistance staff for these 8 districts to allow them to utilize the cost-share funds and get projects on the ground. Approximately \$4,822,500 is contracted to Districts for Agricultural BMP installation for implementation of TMDLs during state fiscal year 2006-2008 (Table 7).

Table 7: Funding Summary for SWCD TMDL Targeted Implementation			
District	TA	WQIF Cost-share	TOTAL
Blue Ridge	\$ 110,000	\$ 500,000	\$ 610,000
Headwaters	\$ 110,000	\$ 627,500	\$ 737,500
Lord Fairfax	\$ 110,000	\$ 360,000	\$ 470,000
Piedmont	\$ 220,000	\$ 1,050,000	\$ 1,270,000
Pittsylvania	\$ 110,000	\$ 600,000	\$ 710,000
Robert E. Lee	\$ 55,000	\$ 250,000	\$ 305,000
Southside	\$ 110,000	\$ 300,000	\$ 410,000
Tazewell	\$ 110,000	\$ 200,000	\$ 310,000
TOTAL	\$ 935,000	\$ 3,887,500	\$ 4,822,500

These eight districts are working on agricultural BMP implementation to implement TMDLs for 46 segments for 57 impairments across Virginia (Table 8).

Table 8: WQIF Funded Targeted TMDL Implementation Projects

District	Basin	TMDL ID	Name	City/County	Miles	Impairment ^a
Blue Ridge	Roanoke	VAW-L14R	Upper Pigg River	Franklin	35.06	Bc
Blue Ridge	Roanoke	VAW-L14R	Story Creek	Franklin	11.66	Bc
Blue Ridge	Roanoke	VAW-L15R	Big Chestnut Creek	Franklin	12.88	Bc
Blue Ridge	Roanoke	VAW-L16R	Lower Pigg River	Franklin	28.92	Bc
Blue Ridge	Roanoke	VAW-L17R	Snow Creek	Franklin	10.98	Bc
Headwaters	Shenandoah/Potomac	VAV-B10R	Middle River	Augusta	15.71	Bc/Be
Headwaters	Shenandoah/Potomac	VAV-B13R	Moffett Creek	Augusta	8.95	Bc/Be
Headwaters	Shenandoah/Potomac	VAV-B14R	Christians Creek	Augusta	31.52	Bc/Be
Headwaters	Shenandoah/Potomac	VAV-B15R	Middle River	Augusta	18.12	Bc
Headwaters	Shenandoah/Potomac	VAV-B15R	Polecat Draft	Augusta	7.47	Bc
Headwaters	Shenandoah/Potomac	VAV-B19R	Mossy Creek	Augusta & Rockingham	9.65	Bc/Be
Headwaters	Shenandoah/Potomac	VAV-B24R	Long Glade Run	Augusta & Rockingham	10.74	Bc
Headwaters	Shenandoah/Potomac	VAV-B28R	Naked Creek	Augusta	3.74	Bc
Headwaters	Shenandoah/Potomac	VAV-B30R	South River	Augusta	11.79	Bc
Lord Fairfax	Shenandoah	VAV-B08R	Opequeon Creek	Clarke & Frederick	33.7	Bc/Be
Lord Fairfax	Shenandoah	VAV-B09R	Abrams Creek	Frederick & Winch.	10.8	Bc/Be
Piedmont	Chowan	VASC-K14R	Nottoway River	Nottoway & PE	17.76	Bc
Piedmont	Chowan	VASC-K15R	Little Nottoway River	Nottoway	9.85	Bc
Piedmont	Chowan	VASC-K16R	UT-Hurricane Branch	Nottoway	1.12	Be
Piedmont	James	VAC-J02R	Spring Creek	Prince Edward	5.5	Bc
Piedmont	James	VAC-J03R	Little Sandy Creek	Prince Edward	7.35	Bc
Piedmont	James	VAC-J04R	Busch River	Prince Edward	5	Bc
Piedmont	James	VAC-J05R	Briery Creek	Prince Edward	9.94	Bc
Piedmont	James	VAC-J06R	Saylers Creek	PE & Amelia	9.08	Bc
Piedmont	James	VAP-J08R	Flat Creek	Amelia	3.99	Bc
Piedmont	James	VAP-J09R	Nibbs Creek	Amelia	5.43	Bc
Piedmont	James	VAP-J11R	Deep Creek	Nottoway	18.67	Bc/DO
Piedmont	James	VAP-J11R	West Creek	Nottoway & Amelia	7.22	Bc
Pittsylvania	Roanoke	VAW-L13L	Leesville Lake	Pittsylvania	154 ac.	Bc
Pittsylvania	Roanoke	VAW-L13R	Old Womans Creek	Pittsylvania	4.86	Bc
Pittsylvania	Roanoke	VAW-L17R	Snow Creek	Pittsylvania	10.98	Bc
Pittsylvania	Roanoke	VAW-L18R	Pigg River	Pittsylvania	28.92	Bc
Robert E. Lee	Roanoke	VAC-L36R	Turnip Creek	Campbell	NA	Bc
Robert E. Lee	Roanoke	VAC-L37R	Cub Creek	Appomattox	NA	Bc
Robert E. Lee	Roanoke	VAW-L34R	Falling River	Campbell	17.92	Bc
Southside	Chowan	VASC-K14R	Big Hounds Creek	Lunenburg	10.35	Bc
Southside	Chowan	VASC-K14R	Nottoway River	Lunenburg	17.76	Bc
Southside	Roanoke	VAC-L36R	Turnip Creek	Charlotte	2.7	Bc
Southside	Roanoke	VAC-L37R	Cub Creek	Charlotte	14.21	Bc
Southside	Roanoke	VAC-L39R	Twittys Creek	Charlotte	7.24	Be
Southside	Roanoke	VAC-L39R	Ash Camp Creek	Charlotte	7.46	Be/Bc
Southside	Roanoke	VAC-L40R	UT-Buffer Creek	Charlotte	2.88	Bc
Southside	Roanoke	VAW-L34R	Falling River	Charlotte	NA	Bc
Tazewell	New	VAS-N36R	Bluestone River	Tazewell	6.05	Bc/Be
Tazewell	New	VAS-N37R	Laurel Fork	Tazewell	2.91	DO/Bc/Be
Tazewell	Tennessee/Big Sandy	VAS-P01R	Upper Clinch River	Tazewell	5.5	Be

a - Impairments (Be)=Benthics, (Bc)=Bacteria

In addition to WQIF cost-share (WQIF) and the §319(h) funded projects, several other TMDL implementation plans are being implemented with other funding sources such as WQIF Request for Proposals (RFP) and local resources.

Measurable Environmental Results:

It is generally too early to show water quality improvements and results for projects in the early stages of implementation (perhaps less than two years old). However there are several projects that are showing marked improvement in water quality (Table 9). For most of the projects it is too early in the implementation process to determine if there are water quality improvements. However Willis River may be an exception to that rule. This project has shown remarkable success in the short 18 months it has been active. A full description of this project can be found in the Case Studies Section of this report. Two of the projects first started by DEQ and/or DMME have resulted in removal from the 303(d) list in 2005 and/or 2006.

Table 9: Status of TMDL/ Watershed Implementation Projects

Watershed Area	TMDL Segment	Water quality Improvement	Year Start	Lead Agency	Funds Used
1-North River*	VAN-B21R, B22R, B27R & B29R	Moderate improvement in 2 of 4 subwatersheds	2001	DCR	\$319(h)
2-Middle Fork Holston River*	VAS-O05R	Moderate improvement	2001	DCR	\$319(h)
3-Upper Blackwater River	LAW-L08R	Some improvement	2001	DCR	\$319(h)
4-Catoctin Creek	VAN-A-02R	Too early to determine	2005	DCR	\$319(h)
5-Holmans Creek	VAV-B45R	Too early to determine	2005	DCR	\$319(h)
6-Willis River	VAC-H36R	Some improvement	2005	DCR	\$319(h)
7-Lower Blackwater River	VAW-L09R, L10R and L11R	Too early to determine	2006	DCR	\$319(h)
8-Cooks Creeks & Blacks Run	VAV-B25R & B26R	Too early to determine	2006	DCR	\$319(h)
9-Thumb, Great, Carter & Deep Runs	VAN-E01R, E02R & E10R	Too early to determine	2006	DCR	\$319(h)
10-Big Otter River	VAW-L23R, L25R, L27R, & L28R	Too early to determine	2006	DCR	\$319(h)
11-Mill and Dodd Creeks	VAW-N20R & N21R	Not started	2007	DCR	\$319(h)
12-Little and Beaver Creeks	VAS-O07	Not started	2007	DCR	\$319(h)
13-Moore's Creek	VAV-H28R	Too early to determine	2005	DCR	RFP
14-Guest River	VAS-P11R	Too early to determine	2005	DCR	\$319(h), RFP
15-Opequeon Creek	VAV-B09R	Too early to determine	2006	DCR	WQIF, RFP
16-Stroubles Creek	VAW-N22R	Too early to determine	2006	DCR	RFP
17-Four Mile Run	VAN-A12R	No improvement	2002	DEQ	OTHER
18-Middle Creek/Tazewell County	VAS-P03R	Delisted 2006	N/a	DMME	OTHER
19-Lynnhaven (Shellfish)	VAT-V08E	Too early to determine	2005	DEQ	OTHER

(*) selected as a EPA Headquarters '319(h) Success Story'

Pollution Reductions: Documenting success and results is important for tracking progress towards full implementation of a TMDL and the eventual de-listing of a particular stream. To track accomplishments, EPA developed Program Activity Measures (PAMs) for all states to report progress and document the success of their nonpoint source pollution control programs. PAM 2, 3, and 4 are to report "Estimated annual reduction in lbs/tons of nitrogen, phosphorous, and sediment from nonpoint sources to waterbodies. And Performance Measure WQ-16

"Estimated annual reduction in million of pounds of phosphorus and nitrogen and in tons of sediment from nonpoint sources to waterbodies"

The TMDL program and its partners work to achieve water quality standards by reducing pollution through installing the BMPs that are established in the implementation plan. BMPs are effective and practical ways to prevent or reduce pollution from nonpoint sources to ensure water

quality. They can range from repairing and/or installing septic systems, stream fencing, and planting riparian buffers. Dozens of voluntary and government funded BMPs are also used throughout the watersheds. In 2006, the ten active TMDL implementation projects all achieved various levels of success in implementing BMPs, on-the-ground activities, and progress towards full implementation of their IPs to achieve the ultimate goal of delisting.

The reduction of pollutants through the installation of BMPs is an integral part of the TMDL Implementation Projects. Table 10 summarizes the pollutant loads from BMPs implemented during the years 2002-2006 (funded through 319(h) Federal Fiscal Year Grants FFY01-FFY05).

**Table 10: Section 319(h) - Pollutant Load Reductions By Project/Program Area
July 1 2002-June 30, 2006**

Project Title	Calendar Year	Bacteria (colony forming units -CFU)	Nitrogen (lbs/yr)	Phosphorus (lbs/yr)	Sedimentation- Siltation (tons)
Middle Fork Holston River (Three Creeks) TMDL Project	2002-2004	6.40E+15	230	4	9
	2005	2.60E+14	800	198	64
	2006	5.37E+14	6,785	1,085	1,192
	TOTAL	7.20E+15	7,814	1,288	1,265
Blackwater River TMDL Project	2002-2004	2.89E+15	212	8	7
	2005	1.80E+15	46	3	1
	2006	1.00E+15	16	3	4
	TOTAL	5.69E+15	274	14	13
North River TMDL Project	2002-2004	3.36E+15	319	26	27
	2005	1.02E+15	1,686	308	192
	2006	4.76E+14	5,756	1,146	499
	TOTAL	4.86E+15	7,762	1,479	718
Catoclin Creek TMDL Project	2005	3.15E+13	226	43	28
	2006	1.07E+14	57	2	1
	TOTAL	1.39E+14	283	45	29
Holmans Creek TMDL Project	2005	4.73E+10	925	182	110
	2006	3.47E+14	78	0	0
	TOTAL	3.47E+14	1,003	182	110
Willis River TMDL Project	2005-2006	1.40E+15	29	5	1
	TOTAL	1.40E+15	29	5	1
Cooks Creek and Blacks Run TMDL Project	2006	4.73E+10	826	79.	51
	TOTAL	4.73E+10	826	79	51
Lower Blackwater River, Maggodee & Gills Creek TMDL Project	2006	8.52E+14	178	11	2
	TOTAL	8.52E+14	178	11	2
Thumb, Deep, Carter and Great Runs TMDL Project	2006		4	4	4
	TOTAL		4	4	4
	Grand Total	2.05E+16	2,733,912	1,002,210	174,401

BMP Implementation: The TMDL program and its partners work to achieve water quality standards by reducing pollution through installing the BMPs that are established in the implementation plan. BMPs are effective and practical ways to prevent or reduce pollution from nonpoint sources to ensure water quality. They can range from repairing and/or installing septic systems, stream fencing, and planting riparian buffers. For the most part all projects were very successful in continuing their installation of BMPs, Table 11 summarizes the BMPs installed for all ten projects funded through 319(h) during 2006 and Table 12 summarizes the BMPs installed from 2001-2006, during the life of the project.

Table 11: Section 319(h) – BMP Installation Project/Program Area 2006						
Project Title	Stream Exclusion Fencing (ft)	# Animals excluded		Septic System Pump Out (RB-1)	Septic System Installation/Repair	Alternative Waste Treatment System (RB-5)
Middle Fork Holston River						
Blackwater River						
North River						
Catoctin Creek						
Holmans Creek						
Willis River						
Cooks Creek and Blacks Run						
Lower Blackwater River						
Thumb, Deep, Carter and Great Runs						
Big Otter River						
Grand Total						

Table 12: Section 319(h) – BMP Installation Project/Program Area 2001-2006						
Project Title	Stream Exclusion Fencing (ft)	# Animals excluded		Septic System Pump Out (RB-1)	Septic System Installation/Repair	Alternative Waste Treatment System (RB-5)
Middle Fork Holston River						
Blackwater River						
North River						
Catoctin Creek						
Holmans Creek						
Willis River						
Cooks Creek and Blacks Run						
Lower Blackwater River						
Thumb, Deep, Carter and Great Runs						
Big Otter River						
Grand Total						

Watershed Restoration and Delisting: EPA has issued targets to each state to achieve various program activity measures that will help us track our progress towards watershed restoration.

Goal 2: Safe and Clean Water - Ensure drinking water is safe. Restore and maintain oceans, watersheds, and their aquatic ecosystems to protect human health, support economic and recreational activities, and provide healthy habitat for fish, plants, and wildlife.

Objective 2: Protect Water Quality - Protect the quality of rivers, lakes and streams on a watershed basis and protect coastal and ocean waters.

Program Measure: WQ-17 Waterbodies identified by States (in 2000 or subsequent years) as being primarily NPS-impaired that will be partially or fully restored (cumulative) by 2008 and 2012. As of the end of 2006 Virginia is still in progress for meeting these deadlines. However 42 free-flowing segments have been approved by EPA de-listing from the Consent Decree (Table 13)

3: Delisting of 303(d) Consent Decree Waters 2002-2006 (non-shelfish)

River Basin	USGS HU	Waterbody ID	Stream	CityCounty	Miles	Pollutant	Source	Year
Bay/CoastAL	02080108	VAT-D07E	Lake Wesley	Virginia Beach		DO		2006
Bay/CoastAL	02080110	VAT-D02R	Petit Branch	Accomack	1.25	NH3	UNK	2006
Chowan	03010201	VAT-K30R	Nottoway River	Southampton		DO	Nat. Cond.	2004
Chowan	03010202	VAT-K35R	Seacock Swamp	Sussex	2.47	pH	Nat. Cond.	2006
Chowan	03010202	VAT-K36R	Blackwater River	Southampton, Isle of Wight	7.41	pH	Nat. Cond.	2004
James	02080201	VAV-I28R	Elk Creek	Rockbridge	6.21	Temp	Nat. Cond.	2006
James	02080202	VAV-I31R	Bratton Run	Rockbridge	11.06	Temp	Nat. Cond.	2006
James	02080202	VAV-I33R	Kerrs Creek	Rockbridge	11.49	BC	NPS	2000
James	02080202	VAV-I35R	Cedar Grove Branch	Rockbridge	4.71	FC	NPS	2004
James	02080202	VAV-I35R	Mill Creek	Rockbridge	8.6	FC	NPS	2004
James	02080203	VAC-H12R	Buffalo River	Nelson	2.45	BC	UNK	2008
James	02080203	VAC-H17R	Little Georgia Creek	Buckingham	6.03	FC	UNK	2006
James	02080203	VAV-H10R	Piney River	Nelson	11.04	FC	UNK	2006
James	02080203	VAV-H16R	Rockfish River	Nelson County	4.87	BC	UNK	2000
James	02080203	VAW-H01R	James River	Bedford, Amherst	5.71	FC	NPS	2002
James	02080204	VAV-H26R	S.F. Rivanna River	Albemarle, Charlottesville	3.58	FC	UNK	2002
James	02080204	VAV-H27R	N.F. Rivanna River	Albemarle	6.35	BC	UNK	2008
James	02080204	VAV-H29R	Rivanna River	Albemarle, Fluvanna	13.13	FC	NPS	2002
James	02080206	VAP-G09R	Diascund Creek	New Kent	6.89	PH	Nat. Cond.	2004
James	02080206	VAT-G10R	College Run	Surry	6.22	DO	Nat. Cond.	2006
New	05050001	VAS-N02R	New River	Grayson	0.6	BC	UNK	2006
Potomac/Shenadoah	02070005	VAV-B18R	Beaver Creek			BC		2006
Potomac/Shenadoah	02070005	VAV-B21R	Dry River	Rockingham	2.86	Temp	Nat. Cond.	2004
Potomac/Shenadoah	02070005	VAV-B22R	North River	Rockingham		Nitrate		2004
Potomac/Shenadoah	02070006	VAV-B52R	Cedar Creek	Shenandoah	18.94	Temp	Nat. Cond.	2006
Rappahannock	02080103	VAN-E06R	Thorton River	Rappahannock	5.4	FC	UNK	2006
Rappahannock	02080103	VAN-E10R	Alcotti Run	Stafford	1.94	FC	UNK	2004
Rappahannock	02080104	VAN-E20R	Claiborne Run	Stafford	5.19	FC	UNK	2004
Roanoke	03010101	VAW-L12L	Smith Mountain Lake	Bedford	8650 Acres	DO	Stratification	2006
Roanoke	03010102	VAC-L41R	Difficult Creek	Halifax	5.8	FC	UNK	2004
Roanoke	03010103	VAC-L57R	Dan River	Pittsylvania	14.42	FC	UNK	2006
Roanoke	03010103	VAW-L42R	Dan River	Patrick	10.16	FC	NPS	2002
Roanoke	03010104	VAW-L61R	Fall Creek	Danville City	12.18	FC	NPS	2002
Roanoke	03010105	VAC-L71R	Banister River	Halifax	12.26	FC	UNK	2006
Tennessee/Big Sandy	05070202	VAS-Q11R	McClure River	Dickenson	14.25	FC	NPS	2002
Tennessee/Big Sandy	06010101	VAS-O09R	N. Fork Holston River	Smyth	5.69	BC	NPS	2004
Tennessee/Big Sandy	06010101	VAS-O13R	N. Fork Holston River	Scott County	5.2	FC	NPS	2004
Tennessee/Big Sandy	06010205	VAS-P03R	Middle Creek	Tazewell	10.7	BC	MINE	2006
York	02080106	VAN-F06R	North Fork Hickory Crk	Louisa		PH		2006
York	02080106	VAP-F12R	Pamunkey River	Hanover	18.85	FC	UNK	2006
Chowan	03010205	VAT-K40R	Northwest River			DO, pH		2006

Water Quality Improvements and Future Actions

A growing challenge for the program is the transition from developing TMDLs to actual water quality improvements. It has been Virginia's expectations to implement TMDLs using existing nonpoint source programs and funding sources despite glaring inadequacies in staff and funding to handle the volume of TMDLs. Existing resources include regulatory permitting programs from DEQ, DCR and DMME that limit discharges to state waters. These programs are utilized when stream impairments are attributed to a permitted facility. For non-permitted activities, Virginia's approach has been to use incentive-based programs such as the Virginia Agricultural Cost Share Program and the State Revolving Loan Fund. Virginia also offers grant funding for the implementation of best management practices and technical assistance in watersheds with approved implementation plans.

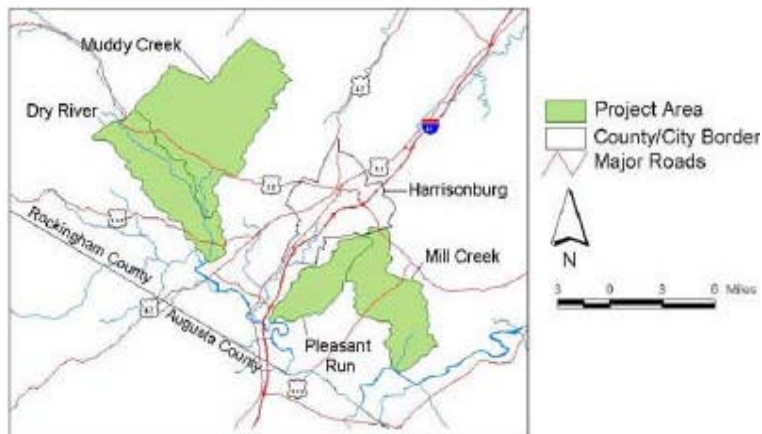
As a result of the Governor's Natural Resources Partnership Agenda, DEQ, DCR, VDACS and VDH began discussions and development of strategies to identify and replace straight pipes on impaired streams and to utilize the Agricultural Stewardship Act to correct pollution sources on impaired streams. These efforts are being coordinated with the state's Watershed Permitting and Planning Task Force but an overall strategy has not been adopted and there was no activity regarding this action in 2006.

Despite the challenges, Virginia's TMDL program has shown that properly applied and maintained best management practices result in measurable improvements in water quality. It will be the goal of Virginia's natural resource agencies to work with the general public to take this success to the next level by successfully remediating some impaired streams within the next few years.

Case Studies: Summary of On-Going TMDL Implementation Efforts

North River Project

Calendar year 2006 was the fifth year of BMP implementation for the three “pilot” TMDL implementation projects that were initiated in late 2001. These projects are based on TMDL implementation plans that were developed for bacteria impairments on 13 stream segments. The pollution load reductions and the number of BMPs implemented in the North River, Blackwater River, and Middle Fork Holston River watersheds from 2001 through 2006 are summarized in 10-12 of the previous section. The specific BMPs by impaired stream segment and the load reductions achieved are provided to EPA Region III semi-annually.



In 2006 DCR, in conjunction with the Shenandoah Valley Soil and Water Conservation District (SVSWCD) in Rockingham County, Virginia, completed its fifth year of a 5-year TMDL implementation project to reduce fecal coliform, and nitrate levels and address benthic impairments in four creeks that drain to the North River (Dry River, Muddy Creek, Pleasant Run, and Mill Creek) through implementation of agricultural and residential BMPs in accordance with previously published and approved TMDLs and a TMDL watershed IP. North River is a tributary of the South Fork of the Shenandoah River (HUC 02070005), which in turn is a tributary of the Potomac River, which discharges into the Chesapeake Bay. The project area is located approximately 3-5 miles west or southwest of Harrisonburg, VA, in Rockingham County. Figure 2 illustrates the North River TMDL Project area.

TMDL staff at the Shenandoah Valley SWCD has been successful in working with the community within the North River TMDL area as a result of continued mailings, educational programs, and public update meetings regarding the participation in the project, water quality improvements, and future plans for implementation. To date, 114 cost-share contracts have been written, 256 individuals have attended educational and outreach activities and 452 farms visits have been made. BMP implementation activities for the North River TMDL Project are summarized below and in Table 12.

Table 12 - BMP Summary for the North River Watershed**(October 1, 2001-September 30, 2006)**

Control Measure	Units	Estimated Units Needed	2006 units installed	Project Total
<u><i>Agriculture Program</i></u>				
Stream Exclusion Fencing	Feet	612,480		32,981
Vegetative Cover on Critical Areas	Acres	5,154		2.259
Forested Riparian Buffer	Acres	n/a		26.5
Nutrient Management Practices	Acres	n/a		515.1
Cover Crop	Acres	n/a		587.9
Vegetative Cover on Cropland	Acres	n/a		60.3
Animal Waste Control Facility	System	n/a		1
Loafing Lot Management	System	n/a		5
<u><i>Residential Program</i></u>				
Septic System Pump Out	System			27
Septic System Repair	System	10		12
Sewer Connections	System			0
Septic System Installation	System	17		5
Alternative Waste Treatment System	System	27		5
<i>Total On-Site System Installation</i>	System	54		22

Muddy Creek & Lower Dry River: In 2006 the North River Project received a big honor by having its sub-watershed projects in the Muddy Creek and Lower Dry River selected as a “Success Story” by EPA Headquarters in Washington, DC. Part of the reason for this honor is due to the fact that Lower Dry River water quality results show that the watershed is approaching the 10% violation rate threshold for 303(d) listing of bacteria impairments.

According to DEQ monitoring data throughout the Shenandoah Valley from 1995-2000 and 2000-2004 (47 stations total), Dry River ranked as the 5th most improved stream and Muddy Creek the 6th most improved in the Valley. A DEQ comparison violation rates before and after TMDL activities commenced shows a marked decrease in the violation rate for bacteria.

“The violation rate (in Lower Dry River) drops from an average of 35% for 1997-2001 to an average of 20% for 2002-2006. Yearly violation rates have dropped steadily beginning in 1997 to 0% in 2002. In 2002, none of the 6 samples collected exceeded the bacteria standard. Since that time, only 1 sample of 5 collected in 2004, 1 sample of 9 collected in 2005, and 3 of 12 samples collected in 2006 exceeded the bacteria standard.” - Excerpted from DEQ “TMDL Program Six Year Progress Report: 2000-2006”

Residential and agricultural successes have largely been the result of partnerships between the Shenandoah Valley Soil and Water Conservation District (SVSWCD) and several state agencies including the Virginia Departments of Conservation and Recreation and Environmental Quality, Virginia Cooperative Extension, Rockingham County Farm Bureau, and USDA - Natural Resources Conservation Service. Numerous tours have been held to promote the

agricultural and residential BMPs offered under the TMDL implementation plan, along with presentations at civic clubs throughout the watersheds, postcard mailings advertising the program, personal contacts with farmers and residents, and meetings updating the community about the water quality improvements.

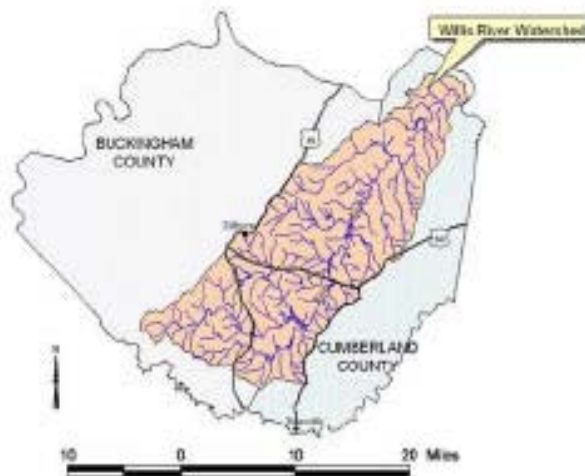
Voluntary BMP Installation: As of April 2006, there has been ten miles of exclusion fencing installed in the Muddy Creek and Lower Dry River watersheds along with an average of 1200 acres per year of cover crops planted for uptake of nutrients. Over 80% (8.3 miles) of the exclusion fencing installed in the watersheds was done voluntarily without the use of cost share funds. Homeowners have also played a large role in the improvements made in water quality in these areas. Over the past four years, there have been thirty septic tank pump-outs, thirteen septic system repairs and replacements, and five alternative septic system installations to replace failing septic systems. The Old Order Mennonite communities in which extensive voluntary best management practices, such as stream exclusions and crossings, loose housing barns, and numerous manure storage units have been installed have displayed a stewardship ethic in implementing pollutant source reductions. These practices have greatly influenced improvements in water quality seen throughout the TMDL implementation project. Due to religious beliefs, this community does not accept any financial assistance for installing BMPs. However, the community strongly recognizes the connection between land use and water quality and took the initiative to install environmentally friendly practices to control runoff from nutrients and sediment from entering the streams.

Impacts of Implementation: Though the North River itself is not directly included in the Implementation Plan, implementation activities in the North River Tributaries have benefited the water quality of the North River itself.

“When comparing earlier data in the watershed (1997-2001) to more recent data (2002-2006), the average of the yearly violation rates drops from 47% for 1997-2001 to just 23% for 2002-2006. This is the greatest decrease in fecal coliform violation rates within the North River IP area, and it represents the cumulative impact of implementation activities in the contributing tributaries. 2004 and 2005 both showed 0% violation rate.” - Excerpted from DEQ *“TMDL Program Six Year Progress Report: 2000-2006”*

Willis River

In 1996, the Willis River was placed on the Commonwealth of Virginia's 1996 303(d) List of Impaired Waters because of violations of the fecal coliform bacteria water quality standard, and remains on the current list. The fecal coliform TMDL for the Willis River watershed was completed in 2002. In 2005, DCR, with extensive input from the Buckingham and Cumberland County governments, DEQ, VDH, Virginia Cooperative Extension (VCE), NRCS, Peter Francisco Soil and Water Conservation District (PFSWCD), James River Association (JRA), Farm Bureau and MapTech, Inc. developed a 5-year TMDL project to reduce fecal coliform levels in the Willis River through implementation of agricultural and residential BMPs in accordance with an approvable TMDL IP. The Willis River (HUC 02080205, VAC-H36R-01) is part of the James River Basin, located in Cumberland County and Buckingham County, Virginia. Figure 3 illustrates the Willis River TMDL Project area.



In July of 2005 implementation efforts began in earnest. From July 2005 through September 2006, extensive activity on the part of Peter Francisco SWCD and local residents has shown incredible progress in implementation. During this period, 10 livestock exclusion systems were completed, excluding 140 beef cattle from more than 20,395 feet of stream. An additional 12 livestock exclusion systems are currently under contract representing the potential exclusion of 405 beef cattle 43,570 feet of stream (Table 13).

<p><i>Table 13 - BMP Summary for the Willis River Watershed</i> (July 1, 2005 - September 30, 2006)</p>				
Control Measure	Units	Estimated Units Needed	2006 units installed	Project Total
<i><u>Agriculture Program</u></i>				
Stream Exclusion Fencing	Feet	475,200	1,151	1,151
Forested Riparian Buffer	Acres		0.9	0.9
<i><u>Residential Program</u></i>				
Septic System Pump Out	System	100	0	0
Septic System Repair	System		0	0
Septic System Installation	System	4	0	0
Alternative Waste Treatment System	System	1	0	0
Total On-Site System Installation	System	5	0	0

Even though this project has only been active for about 18 months, the Willis River is showing definite signs of improved water quality.

When comparing data prior to TMDL activities in the watershed (1990-2001) to more recent data (2002-2006), however, the average of the yearly violation rate drops from 28% for 1990-2001 to

8% for 2002-2006. The moving geometric mean of fecal coliform concentrations also confirms that fecal coliform levels have decreased since TMDL activities began in 2002. Combined evidence from yearly fecal coliform violation rates and from the moving geometric mean of fecal coliform concentrations suggests that water quality in Willis River has improved since initiation of TMDL activities in the watershed. This watershed is approaching the 10% violation rate threshold for 303(d) listing of bacteria impairments. In fact, the middle section of the river from the confluence with Tongue Quarter Creek to the confluence with Buffalo Creek (18.03 miles) is a de-list candidate in 2006 because data shows that bacteria levels are now above critical levels.” - Excerpted from DEQ “TMDL Program Six Year Progress Report: 2000-2006”